

Appl. No. 09/963,873

Reply to Office action of September 9, 2004

Amendments to the Claims

The following listing of claims replaces all prior versions and listings of claims in the application.

1. (Currently Amended) Registration artifact for use in registering fluoroscopic images comprising:

a plurality of radio-opaque fiducials embedded in a radio-transparent support structure ~~arranged~~ in a known geometric relationship; and

a plurality of spatially and optically trackable markers ~~disposed on~~ depending from the support structure artifact in a known geometric relationship to fiducials.

2. (Currently amended) A method for registering fluoroscopic images comprising: capturing with a fluoroscope a first fluoroscopic image of a patient and a registration artifact from a first perspective, the registration artifact including, a plurality of radio-opaque fiducials arranged in a known geometric relationship and a plurality of optically trackable markers disposed in a known geometric relationship to fiducials;

determining the position of the registration artifact in the first fluoroscopic image with respect to a known coordinate frame by determining the position of the optically trackable markers using ~~the a tracking system, the tracking system being separate from the patient and the fluoroscope;~~ and

capturing a second fluoroscopic image of the patient and the registration artifact frame from a second perspective;

determining the position of the registration artifact in the second fluoroscopic image with respect to the known coordinate frame by determining the position of the optically trackable markers using the tracking system that senses the reflected infrared radiation;

registering the first and second fluoroscopic images using the positions of the fiducials in each fluoroscopic image and the determined positions of the registration artifact.

~~registering the fluoroscopic images.~~

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3. (Currently amended) The registration artifact of claim 1, wherein the optically trackable markers includes a an infrared emitting diode (IRED).

4. (Currently amended) The registration artifact of claim 1, wherein the optically trackable marker includes a reflective sphere to reflect infrared radiation.

5. (Cancelled)

6. (Currently amended) The registration artifact of claim 1, further comprising a radio-transparent body to which the plurality of fiducials and plurality of spatially and optically trackable markers are mounted.

7. (Currently amended) An image guided surgery system comprising:
a registration artifact, including a plurality of radio-opaque fiducials arranged embedded on a radio-transparent body in a known geometric relationship, and a plurality of spatially and optically trackable markers disposed on depending from the artifact in a known geometric relationship to fiducials;

a an optical tracking system for determining the positions of the plurality of optically trackable markers, the optical tracking system being separate from the patient and a fluoroscope;

a computer in communication with the tracking system for receiving information on the positions of the optically trackable markers; the computer adapted for receiving a fluoroscopic image taken of the patient by the fluoroscope with the artifact in the picture and registering the image using the positions of the optically trackable markers when the fluoroscopic image is

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taken, the positions of the radio-opaque fiducials within the fluoroscopic image and the known relationship between the plurality of optically trackable markers and the plurality of radio-opaque fiducials.

8. (Currently amended) The registration artifact of claim 7, wherein the optically trackable marker includes a an infrared emitting diode (IRED).

9. (Currently amended) The registration artifact of claim 7, wherein the optically trackable marker includes a reflective sphere to reflect infrared radiation.

10. (Cancelled)